

[Name of Document] SPECIFICATION

[Title of the Invention] ELECTRO-OPTICAL DEVICE AND METHOD OF DRIVING THE SAME,  
ORGANIC ELECTROLUMINESCENT DISPLAY DEVICE, AND ELECTRONIC  
APPARATUS

[Claims]

[Claim 1] An electro-optical device comprising: a plurality of data lines and scan lines which are arranged in a matrix manner; electro-optical elements which are disposed correspondingly to intersections of the data lines and the scan lines;

a data line driving circuit capable of driving the data lines; and an auxiliary data line driving circuit capable of driving the data lines separately from the data line driving circuit.

[Claim 2] The electro-optical device according to Claim 1, wherein all of the data lines are connected to the data line driving circuit, and only a portion of the data lines is selectively connected to the auxiliary data line driving circuit.

[Claim 3] The electro-optical device according to Claim 1 or 2, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a decoder.

[Claim 4] The electro-optical device according to any one of Claims 1 to 3, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a shift register.

[Claim 5] The electro-optical device according to any one of Claims 1 to 4, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a latch circuit.

[Claim 6] The electro-optical device according to any one of Claims 1 to 5, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a D/A converter circuit.

[Claim 7] The electro-optical device according to any one of Claims 1 to 6, wherein, of the data lines, only a data line that is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 8] The electro-optical device according to any one of Claims 1 to 7, wherein three dots

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consisting of an electro-optical element capable of emitting red, an electro-optical element capable of emitting green, and an electro-optical element capable of emitting blue constitute one pixel to enable a color display, and only a data line corresponding to a particular color of the three colors is selectively connected to the auxiliary data line driving circuit.

[Claim 9] The electro-optical device according to Claim 8, wherein only a data line which corresponds to the particular color and which is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 10] The electro-optical device according to any one of Claims 1 to 9, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit is enabled when the full-dot display mode is selected and the auxiliary data line driving circuit is enabled when the character display mode is selected.

[Claim 11] The electro-optical device according to any one of Claims 1 to 10, further comprising a scan line driving circuit capable of driving the scan lines, and an auxiliary scan line driving circuit capable of driving the scan lines separately from the scan line driving circuit,

wherein all of the scan lines are connected to the scan line driving circuit, and only a portion of the scan lines is selectively connected to the auxiliary scan line driving circuit.

[Claim 12] The electro-optical device according to Claim 11, wherein at least one of the scan line driving circuit and the auxiliary scan line driving circuit includes a decoder.

[Claim 13] The electro-optical device according to Claim 11 or 12, wherein at least one of the scan line driving circuit and the auxiliary scan line driving circuit includes a shift register.

[Claim 14] The electro-optical device according to any one of Claims 11 to 13, wherein, of the scan lines, only a scan line that is located in a specific region of a screen is selectively connected to the auxiliary scan line driving circuit.

[Claim 15] The electro-optical device according to any one of Claims 11 to 14, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit and the

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scan line driving circuit are enabled when the full-dot display mode is selected and the auxiliary data line driving circuit and the auxiliary scan line driving circuit are enabled when the character display mode is selected.

[Claim 16] The electro-optical device according to Claim 10 or 15, wherein the number of grayscale levels is smaller when the character display mode is selected than when the full-dot display mode is selected.

[Claim 17] The electro-optical device according to any one of Claims 10, 15, and 16, wherein a frame frequency is lower when the character display mode is selected than when the full-dot display mode is selected.

[Claim 18] The electro-optical device according to any one of Claims 10, 15, 16, and 17, wherein all pixels can be reset altogether when the full-dot display mode changes to the character display mode.

[Claim 19] The electro-optical device according to any one of Claims 1 to 18, wherein the data lines are driven by switching between the data line driving circuit and the auxiliary data line driving circuit in a period during which scan lines of one screen are being driven.

[Claim 20] A method of driving an electro-optical device comprising a plurality of data lines and scan lines which are arranged in a matrix manner, and electro-optical elements which are disposed correspondingly to intersections of the data lines and the scan lines, the method comprising:

switching between a data line driving circuit and an auxiliary data line driving circuit to drive the data lines, the data line driving circuit being capable of driving the data lines, the auxiliary data line driving circuit being capable of driving the data lines separately from the data line driving circuit.

[Claim 21] The method according to Claim 20, wherein all of the data lines are connected to the data line driving circuit, and only a portion of the data lines is selectively connected to the auxiliary data line driving circuit.

[Claim 22] The method according to Claim 20 or 21, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a decoder.

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[Claim 23] The method according to any one of Claims 20 to 22, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a shift register.

[Claim 24] The method according to any one of Claims 20 to 23, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a latch circuit.

[Claim 25] The method according to any one of Claims 20 to 24, wherein at least one of the data line driving circuit and the auxiliary data line driving circuit includes a D/A converter circuit.

[Claim 26] The method according to any one of Claims 20 to 25, wherein, of the data lines, only a data line that is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 27] The method according to any one of Claims 20 to 26, wherein three dots consisting of an electro-optical element capable of emitting red, an electro-optical element capable of emitting green, and an electro-optical element capable of emitting blue constitute one pixel to enable a color display, and only a data line corresponding to a particular color of the three colors is selectively connected to the auxiliary data line driving circuit.

[Claim 28] The method according to Claim 27, wherein only a data line which corresponds to the particular color and which is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 29] The method according to any one of Claims 20 to 28, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit is enabled when the full-dot display mode is selected and the auxiliary data line driving circuit is enabled when the character display mode is selected.

[Claim 30] The method according to any one of Claims 20 to 29, further comprising switching between a scan line driving circuit and an auxiliary scan line driving circuit to drive the scan lines, the scan line driving circuit to which all of the scan lines are connected being capable of driving the scan lines, the auxiliary scan line driving circuit to which only a portion of the scan lines is selectively

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connected being capable of driving the portion of the scan lines separately from the scan line driving circuit.

[Claim 31] The method according to Claim 30, wherein at least one of the scan line driving circuit and the auxiliary scan line driving circuit includes a decoder.

[Claim 32] The method according to Claim 30 or 31, wherein at least one of the scan line driving circuit and the auxiliary scan line driving circuit includes a shift register.

[Claim 33] The method according to any one of Claims 30 to 32, wherein, of the scan lines, only a scan line that is located in a specific region of a screen is selectively connected to the auxiliary scan line driving circuit.

[Claim 34] The method according to any one of Claims 30 to 33, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit and the scan line driving circuit are enabled when the full-dot display mode is selected and the auxiliary data line driving circuit and the auxiliary scan line driving circuit are enabled when the character display mode is selected.

[Claim 35] The method according to Claim 29 or 34, wherein the number of grayscale levels is smaller when the character display mode is selected than when the full-dot display mode is selected.

[Claim 36] The method according to any one of Claims 29, 34, and 35, wherein a frame frequency is lower when the character display mode is selected than when the full-dot display mode is selected.

[Claim 37] The method according to any one of Claims 29, 34, 35, and 36, wherein all pixels can be reset altogether when the full-dot display mode changes to the character display mode.

[Claim 38] The method according to any one of Claims 20 to 37, wherein the data lines are driven by switching between the data line driving circuit and the auxiliary data line driving circuit in a period during which scan lines of one screen are being driven.

[Claim 39] An organic electroluminescent display device comprising: a plurality of row lines and a plurality of data lines which are arranged in a matrix manner; organic electroluminescent elements which are disposed correspondingly to intersections of the row lines and the data lines; a data line

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driving circuit capable of driving the data lines; a row driving circuit capable of driving the row lines;  
and

an auxiliary data line driving circuit, separate from the data line driving circuit, for driving the data lines, the auxiliary data line driving circuit including a decoder, wherein all of the data lines are connected to the data line driving circuit and only a portion of the data lines is selectively connected to the auxiliary data line driving circuit.

[Claim 40] An organic electroluminescent display device comprising: a plurality of row lines and a plurality of data lines which are arranged in a matrix manner; organic electroluminescent elements which are disposed correspondingly to intersections of the row lines and the data lines; a data line driving circuit capable of driving the data lines; a row driving circuit capable of driving the row lines;  
and

an auxiliary data line driving circuit, separate from the data line driving circuit, for driving the data lines, the auxiliary data line driving circuit including a shift register, wherein all of the data lines are connected to the data line driving circuit and only a portion of the data lines is selectively connected to the auxiliary data line driving circuit.

[Claim 41] The organic electroluminescent display device according to Claim 39 or 40, wherein the data line driving circuit includes a shift register.

[Claim 42] The organic electroluminescent display device according to any one of Claims 39 to 41, wherein the row driving circuit includes a decoder.

[Claim 43] The organic electroluminescent display device according to any one of Claims 39 to 42, wherein, of the data lines, only a data line that is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 44] The organic electroluminescent display device according to any one of Claims 39 to 43, wherein three dots consisting of an organic electroluminescent element capable of emitting red, an organic electroluminescent element capable of emitting green, and an organic electroluminescent

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element capable of emitting blue constitute one pixel to enable a color display, and only a data line corresponding to a particular color of the three colors is selectively connected to the auxiliary data line driving circuit.

[Claim 45] The organic electroluminescent display device according to Claim 44, wherein the particular color is green.

[Claim 46] The organic electroluminescent display device according to Claim 44 or 45, wherein only a data line which corresponds to the particular color and which is located in a specific region of a screen is selectively connected to the auxiliary data line driving circuit.

[Claim 47] The organic electroluminescent display device according to any one of Claims 39 to 46, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit is enabled when the full-dot display mode is selected and the auxiliary data line driving circuit is enabled when the character display mode is selected.

[Claim 48] The organic electroluminescent display device according to any one of Claims 39 to 46, further comprising an auxiliary row line driving circuit, separate from the row driving circuit, for driving the row lines, the auxiliary row driving circuit including a decoder, wherein all of the row lines are connected to the row driving circuit and only a portion of the row lines is selectively connected to the auxiliary row driving circuit.

[Claim 49] The organic electroluminescent display device according to any one of Claims 39 to 46, further comprising an auxiliary row driving circuit, separate from the row driving circuit, for driving the row lines, the auxiliary row driving circuit including a shift register, wherein all of the row lines are connected to the row driving circuit and only a portion of the row lines is selectively connected to the auxiliary row driving circuit.

[Claim 50] The organic electroluminescent display device according to Claim 48 or 49, wherein, of the row lines, only a row line that is located in a specific region of a screen is selectively connected to the auxiliary row driving circuit.

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[Claim 51] The organic electroluminescent display device according to any one of Claims 49 to 50, wherein a full-dot display mode and a character display mode can be switched so that the data line driving circuit and the row driving circuit are enabled when the full-dot display mode is selected and the auxiliary data line driving circuit and the auxiliary row driving circuit are enabled when the character display mode is selected.

[Claim 52] The organic electroluminescent display device according to Claim 47 or 51, wherein the number of grayscale levels is smaller when the character display mode is selected than when the full-dot display mode is selected.

[Claim 53] The organic electroluminescent display device according to any one of Claims 47, 51, and 52, wherein a frame frequency is lower when the character display mode is selected than when the full-dot display mode is selected.

[Claim 54] The organic electroluminescent display device according to any one of Claims 47, 51, 52, and 53, wherein all pixels can be reset altogether when the full-dot display mode changes to the character display mode.

[Claim 55] The method according to any one of claims of 20 to 37, the data lines are driven by switching between the data line driving circuit and the auxiliary data line driving circuit in one horizontal scan period.

[Claim 55] An electronic apparatus comprising a display device for displaying data, wherein said display device comprises an electro-optical display device using the electro-optical device according to any one of Claims 1 to 19, or the organic electroluminescent display device according to any one of claims 39 to 54.

[Detailed Description of the Invention]

[Technical Field of the Invention]

The present invention relates to an electro-optical device and a method of driving the same, an organic electroluminescent display device using (electroluminescence) elements, and an electronic

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